

# Thomas takes news of delayed shuttle ride home in stride

By Leslie Eaton

U.S. Astronaut Andy Thomas, on the Russian Space Station Mir, received news that his ride home will be delayed by a few days.

Shuttle managers announced that the launch of STS-91, the final planned shuttle-Mir docking mission, will be delayed until June 2.

Shuttle managers also noted that there will be a tanking test of the new lightweight external tank on May 18 and the STS-91 Flight Readiness Review is scheduled for May 20.

All systems aboard the Mir Space Station are in good working order as Russian flight controllers last week tested a new thruster assembly that was installed during a space walk by Mir 25 Cosmonauts Talgat Musabayev and Nikolai Budarin.

Following the checkout of the boom jet assembly atop the "Sofora" truss on the Kvant-1 module, the unit was integrated into the station's attitude control system to provide roll control that was temporarily handled by thrusters on the Priroda module.

Thomas, marked his 100th day in orbit May 1 and continues his scientific research program. His primary focus is on the Biotechnology System Co-Culture experiment. He provided the Mir Operations Support Team with the latest video of the unit, which has been operating since early in his stay on the station. The cause of air bubbles in the chamber still is being analyzed by experiment investigators, but has not appeared to hamper the growth of the three-dimensional cancer cells,

which are the focus of the experiment.

He also continues to periodically gather blood, urine and saliva samples to be evaluated after his mission on the effects of long duration space flight on the human body.

Science investigations by Thomas on Mir are part of 27 studies in the areas of Advanced Technology, Earth Sciences, Human Life Sciences, Microgravity Research, and International Space Station Risk Mitigation.

Thomas also took time from his science activities to answer questions that had been submitted by Australian school children. Answers to the questions are posted on the Internet at: <http://shuttle-mir.nasa.gov/shuttle-mir/mir25/status/current/thomas.html>



In his latest letter home posted on the NASA Shuttle-Mir Web at: <http://shuttle-mir.nasa.gov> Thomas described his experience unpacking and setting up home in Mir in zero gravity.

"It can be a joy to experience, but also can really make your work day difficult. The most frustrating thing is that you are forever losing things," Thomas wrote. "You might be rummaging through a bag to find one item, while all the other contents are floating away, and before you know it, they are gone, and lost. They may even be close by to you, but as you look around you tend to focus your gaze only on surfaces, where we are accustomed to seeing things, and not look at the empty space just in front of us."

Thomas is the seventh and final NASA astronaut earmarked to live and work aboard Mir.



NASA Photo S90E5292

The seven-member STS-90 crew enjoys some time off during the marathon Neurolab research mission by rehearsing and performing its own downlink music video, complete with "cool" shades. Front row, from left, are Pilot Scott Altman, Commander Rick Searfoss, and Mission Specialist Kay Hire. Back row, from left, are Payload Specialists Jay Buckley, and Jim Pawelczyk, and Mission Specialists Rick Linnehan and Dave Williams.

## Science teams dive into ocean of data

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Toadfish reported receiving intermittent data, but enough to assume experiment success. Early post-flight evaluations indicate that about 90 percent of the 200 young swordtail fish that flew died, probably because their water was too warm.

The Neuronal Plasticity team saw rodents performing on the Escher Staircase and the Magic Carpet apparatus, although no data was collected on two of the four rodents. The investigator said that early data shows the experimental hypotheses can be evaluated. The planned number of rodent dissections were performed on orbit for the Neuronal Plasticity Team.

The Mammalian Development team dealt with the lessened number of young rats available after experiencing unexpected deaths within the litters and did achieve some data collection in the final days. The team redistributed the animals to assure that all the primary science requirements were met, with only secondary objectives partially affected by the smaller number of animals available.

"It was disheartening to me to see that happen," said Linnehan, a veterinarian who worked with other

crew members into his sleep shift to personally treat the newborn rats. "When you initially see this, you say, 'Oh, no!' Then we started treating. I guess the veterinarian in me kicked in. That's something that has to be taken into account in the future, how mothers are going to be able to rear, be it human or other species."

The Neurobiology Team studying the development of gravity sensors on crickets ran as planned with no hardware problems

"We expected a lot of success, and our overall expectations were exceeded," Homick said. "We went into this mission with a number of challenges; a busy timeline, complex experimental hardware systems, and a number of difficult experimental procedures using cutting edge technology never before attempted in space flight."

Columbia for the most part operated smoothly, allowing the crew to devote its attention to meeting science objectives. Only a repair to the Regenerative Carbon Dioxide Removal System, which required a one-inch piece of aluminum tape and some ingenuity by engineers on the ground, and a work-around for a blocked waste water dump line were required during the flight.

## NASA tests hair-raising technique to clean up oil spills

Most folks with oily hair use shampoo to get the oil out. But one Alabama hairdresser likes oily hair and is working with NASA to use human hair to soak up oil spills. Researchers at Marshall Space Flight Center are testing a hair-raising recovery technique for oil spilled in water.

The idea is the inspiration of Phillip McCrory, a Madison, Ala., hairdresser. McCrory was watching television coverage of 1989's oil spill in Alaska's Prince William Sound. "I saw an otter being rescued whose fur was saturated with oil," said McCrory. "I thought, if animal fur can

trap and hold spilled oil, why can't human hair?"

In a home experiment, McCrory stuffed five pounds of hair he'd cut into a pair of his wife's pantyhose. He tied the ankles of the hosiery together to form a ring-shaped collection bundle. Then, filling his son's wading pool with water, he put the hair-filled ring of hosiery into the center of the pool and poured used motor oil into the middle.

"When I pulled the legs of the hosiery ring together, the oil had adsorbed onto the hair inside of it," McCrory said. "I couldn't see a trace of oil in the water." McCrory found

that human hair adsorbs—rather than absorbs—oil. That is, the oil gathers in layers on the hair's surface. This allows for easy recovery of the oil and its reuse by simply squeezing it from the collection bundles.

"When I wrung the hosiery out, most of the oil was recovered," said McCrory. "The remainder was broken down and disposed of when I washed the hosiery with detergent."

McCrory, who lives near Marshall, approached the Center's Technology Transfer Office with the proposal that NASA test his idea under controlled laboratory conditions. Marshall agreed because its researchers

believed it had potential use by NASA and other U.S. government agencies.

Successful field tests also influenced Marshall's decision to test McCrory's system further. In an initial test, David Glover, a chemical systems supervisor for Marshall contractor BAMS, Inc., filled a 55-gallon oil drum with 40 gallons of water and 15 gallons of oil. "The mixture was filtered through nylon bags filled with hair," Glover said. "When the water was tested after just a single pass through McCrory's innovative filter, only 17 parts of oil per million parts of water remained."

McCrory estimates that 25,000

pounds of hair in nylon collection bags may be sufficient to adsorb 170,000 gallons of spilled oil. Preliminary tests show that a gallon of oil can be adsorbed in less than two minutes with McCrory's method.

There's also a potential cost savings in McCrory's method. Present oil cleanup methods cost approximately \$10 to recover a gallon of oil. McCrory's system may cost as little as \$2 per gallon and offers the additional benefit of being able to use the recovered oil for fuel.

Tests of the new system are expected to be completed later this spring.

## Astronomers discover construction zone for planets around nearby star

NASA astronomers using the new Keck II telescope in Hawaii have discovered what appears to be the clearest evidence yet of a budding solar system around a nearby star.

Scientists released an image of the probable site of planet formation around a star known as HR 4796, about 220 light-years from Earth in the constellation Centaurus. The image, taken with a sensitive infrared camera developed at NASA's Jet Propulsion Laboratory, shows a swirling disk of dust around the star. Within the disk is a telltale empty region that may have been swept clean when material was pulled into newly formed planetary bodies, the scientists said.

"This may be what our solar system looked like at the end of its

main planetary formation phase," said Dr. Michael Werner of JPL, who co-discovered the region, along with Drs. David Koerner and Michael Ressler, also of JPL, and Dana Backman of Franklin and Marshall College, Lancaster, Penn. "Comets may be forming right now in the disk's outer portion from remaining debris."

The discovery was made on March 16 from the giant 33-foot Keck II telescope atop Mauna Kea, Hawaii. Keck II and its twin, Keck I, are the world's largest optical and infrared telescopes.

Koerner of JPL said the finding represents a "missing link" in the study of how planetary systems are born and evolve. "In a sense, we've already peeked into the stellar family album and seen baby pictures

and middle-aged photos," Koerner said. "With HR 4796, we're seeing a picture of a young adult star starting its own family of planets. This is the link between disks around very young stars and disks around mature stars, many with planets already orbiting them."

The discovery of the HR 4796 disk was made in just one hour of observing time at Keck, but the JPL team plans to return to Hawaii in June for further studies. They hope to learn more about the structure, composition and size of this disk, and to determine how disks around stars in our galaxy produce planets.

The Keck II image of HR 4796 and information on the MIRLIN camera are available on the World Wide Web at: <http://cougar.jpl.nasa.gov/mirlin.html>.



Dick Covey, senior manager on the Boeing Consolidated Space Operations Contract Team in Houston, presents one of four shuttle flags to Rick Piercy, center, chief operating officer of Lewis Center for Educational Research in Apple Valley, Calif., during dedication of a new addition. The center seeks to improve and expand science and technology education in the region. From left are Covey, San Bernardino County First District Supervisor Kathy Davis, California Assemblyman Keith Olberg, Boeing Reusable Space Systems Vice President and General Manager Rick Stephens, Piercy, U.S. Rep. Jerry Lewis (R-Calif.), California First Lady Gayle Wilson, NASA Administrator Dan Goldin and Jet Propulsion Laboratory Director Ed Stone.